MINERALOGY AND PETROGRAPHY.[1]

The Trachytes and Andesites of the Siebengebirge.—In the course of a discussion on the geological relations of the trachyte and andesite of the Siebengebirge, Grosser[2] describes the various occurrences of these rocks and gives an outline of their petrographical characteristics. The trachytes he separates into typical, andesitic and aegerine varieties, and the andesites into trachytic and basaltic kinds. In the typical trachytes hornblende phenocrysts are frequent, but crystals of this mineral in the groundmass are unknown. Among the andesites the trachytic variety is noted for the absence of dark components from the groundmass and their rarity among the rock's phenocrysts. The basaltic andesite is rich in iron minerals, both as phenocrysts and as constituents of the groundmass. The order of eruption was trachyte, andesite, basalt.

A Variolitic Dyke in Ireland.—A variolitic dyke from Annalong, County Down, Ireland, resembles in the hand-specimen the variolites from Mt. Genévre. Cole[3] mentions it as consisting of devitrified glass, often containing skeleton crystals of magnetite, augite and plagioclase, and enclosing spherulites that are much larger toward the center than at the edge of the dyke. Thin selvages, 1 cm. in thickness, with very small spherulites scattered through them, exist on the sides of the dyke. Beyond these there is an abrupt transition to material containing the large spherulites. The selvages evidently cooled and lined the walls of the crevice now occupied by the dyke, before the interior filling consolidated; for not only is the transition between the substances of the two portions sharp, but the spherulites of the interior mass have in some cases grown from the line separating the two portions.

The Chemical Nature of Eruptive Rocks.—Lang[4] has returned to his study[5] of the chemical nature of eruptives. After a critical examination of many fresh specimens, the author concludes that the mineralogical nature of igneous rocks cannot be determined from

[1] Edited by Dr. W. S. Bayley, Colby University, Waterville, Me.

[2] Min. u. Petrog., Mitth., xiii, p. 39.

[3] Sci. Proc. Roy. Dub. Soc., 1892, p. 511.

[4] Min. u. Petrog. Mitth., xiii, p.115.

[5] Cf. AMERICAN NATURALIST, 1892, p. 334.

their chemical composition, but that types with the same general chemical relationships possess the same general mineralogical character. The author also gives his views on the relationships existing between the various rock types, as based on their calcium and alkali ratios, and, while not so stating it, he shows that the emanations from an eruptive center are consanguinous.

Norites in the Eastern United States.—Along a shear zone in the norite of Avalanch Lake in the Adirondacks, Kemp[6] finds what he believes to be a schistose phase of the rock in which several new minerals have been developed. The massive norite consists chiefly of plagioclase, with a little hornblende, enstatite and magnetite. In the schistose rock, which is much more basic than the norite, are broken pieces of plagioclase, shreds of hypersthene, grains of green monoclinic pyroxene, pink garnet, greenish-brown hornblende, biotite and magnetite, of which both the monoclinic pyroxene and the garnet are supposed to have been produced from the hypersthene and the plagioclase of the original norite. The schist resembles an eclogite. The same writer[7] records the discovery of a new occurrence of norite or of hypersthene gabbro at Artsdalen's quarry in Bucks County, Pa. It is associated with a limestone which is the matrix of a large number of metamorphic minerals. It is thought that this limestone may be a block brought from below by the eruptive. The region surrounding the quarry is underlain by pre-Cambrian rocks, but it is almost without exposures. The occurrence of norite here is interesting as affording a link connecting the otherwise separated Baltimore and Cortland areas of basic eruptives.

The Ottrelite Conglomerate of Vermont.—Reference has already been made in these notes to the discovery of an ottrelite conglomerate[8] in the Green Mountains of Vermont. Whittle[9] has now given us in more detail the description of its occurrence, and adds to this many items of interest concerning the dynamic schists associated with it. Among other things connected with the minerals of the conglomerate he mentions the secondary enlargement of clastic tourmaline grains and describes the alteration of microcline pebbles into quartz, sericite, biotite and albite. In one microcline there are many inclusions of limonite and rhombs of siderite. As the sericite grows it clears

[6] Amer. Journ. Sci., Aug., 1892, p. 109.

[7] Trans. N. Y. Acad. Sci., xii, p. 71.

[8] AMERICAN NATURALIST, April, 1893, p. 382.

[9] Bull. Geol. Soc. Amer., iv, p. 147.

the microcline of these, so that around each grain of the mica is a zone of pellucid feldspar, and on both sides of veins of the sericite are clear borders of microcline entirely free from inclusions of any kind.

Chalcedony and other Silicious Spherulites.—A well-illustrated article by Levy and Meunier-Chalmas[10] treats of various forms assumed by the molecule Si O_2 in the production of spherulites. Chalcedony has heretofore been regarded as a mixture of quartz and opal. The present authors have had an opportunity to study some excellent specimens of silica spherulites and concretions from the gypsum beds in the Paris Basin. Chalcedony and two new forms of silica, called by the authors quartzine and lutecite, are the components of these concretions. All three of these substances are fibrous forms of the same mineral, which is positive and biaxial, with an optical angle varying between 20°–35°. Thus they are different from quartz. The distinctions between the three varieties rest upon their habit. Chalcedony is elongated parallel to the base of the crystals, and quartzine parallel to the plane of their optical axis, while the lutecite fibers are elongated in a direction making an angle of 29° with the optical axial plane. The relation of the long axis of each variety to the optical constants of the mineral is carefully worked out, and the appearances of thin sections of their groupings are illustrated by eight beautifully executed photographs.

Petrographical News.—Andrea and Osann[11] ascribe the existence of a porphyry breccia at Dorsenheim near Heidelberg to the crushing of porphyry by faulting and the cementing together of the fragments thus made by siliceous material.

A series of high dipping crystalline schists near Salida, Col., is regarded by Cross[12] as having originated by the alteration of great flows of basic and acid lavas erupted in Algonkian time. Though the rocks are now hornblende and micaceous schists, some of them still present a few of the structural features of diabases and porphyries.

Danalite from Redruth, Cornwall.—Tetrahedra of danalite at Redruth, Cornwall, are associated with quartz and arsenopyrite. Miers[13] mentions them as projecting from a layer of massive danalite with a thickness of from a quarter to half an inch. Some of the crys-

[10] Bull. Soc. Franç d. Min., xv, p. 159.

[11] Mitth. gross. Badisch. geol. Landesanst, ii, p. 365.

[12] Col. Sci. Soc., Jan. 2, 1893.

[13] Miner. Magazine, x, p. 10.

tals measure 30–50 mms. across. They are almandine-red in color, are translucent, and have a light pink streak, a hardness of 5.5 and a density of 3.350. An analysis gave:

SiO_2	FeO	MnO	ZnO	BeO	CaO	S	Total
29.48	37.53	11.23	4.87	14.17	tr	5.04	=102.62

corresponding to R.S. 7RO. $3SiO_2$.

Mirabilite Changed to Thenardite.—Two crystals of mirabilite implanted on a mass of rock-salt from Aussee, Salzkammergut, that has been in the possession of the University of Vienna six years, have, in this time, so changed that they now consist simply of a thin shell composed of a crystalline aggregate whose inner surface is completely drusy. Within this crust there is usually a hollow, but occasionally a part of the hollow may be filled by a group of crystals like those forming the shell. These crystals are determined by Pelikan[14] to be *thenardites* of a short pyramidal habit, bounded by the planes P. $\frac{1}{3}$P, P$\bar{\infty}$, $\frac{1}{3}$P$\frac{1}{2}$ and ∞P$\frac{1}{2}$, with an axial ratio of $a : b : c = .5970 : 1 : 1.2541$. The crystals had been kept during the six years in an air-tight enclosure at a nearly uniform temperature, so that the change from their original condition must have been due solely to the influence of the small amount of moisture within the enclosure.

Mineralogical News.—Crystals of the rare *uranatile* from Schneeberg, Saxony, and from the Joachimsthal, Bohemia, have been measured by Pjatnitzky,[15] who concludes that they are triclinic and not orthorhombic as Zepharovich supposed. Their axial ratio $a : b : c = .6257 : 1 : .5943$. The mineral has a citron or sulphur-yellow color, with very weak dichroism. *Uranophane*, according to the author, should not yet be considered a species. Its chemical composition is the same as that of uranatile, but its crystallization has not yet been determined.

The rare plane 2O∞ has been detected by Pelikan[16] on salt crystals from Stannia, Galicia. Upon examining sections of *halite* from this locality, the author discovered in them many inclusions of petroleum zonally arranged. The cavities in which the oil is contained are either pear-shaped or are negative crystals, entirely or only partially filled with the liquid, which must have been under greater pressure at the

[14] Min. u. Petrog. Mitth., 1892, xii, p. 476.

[15] Zeits. f. Kryst., xxi, 1892, p. 74.

[16] Min. u. Petrog Mitth., xii, p. 483.

time of its imprisonment. From the distribution of these inclusions the author concludes that the crystals were first cubes, then tetrahexahedra ($2O\infty$), and finally cubes, as at present.

Jannetaz[17] has made an analysis of the black garnet *pyreneite*, now the subject of so much discussion[18] in Europe, and has found it to consist of:

SiO_2	Al_2O_3	FeO	MgO	CaO	Total
39.4	10.0	18.6	1.0	31.21	= 100.21

It is thus neither melanite nor grossularite, but is intermediate in composition between the two. Its density is 3.7

Miers[19] has succeeded in obtaining some excellent though tiny crystals of *orpiment* by dissolving in hydrochloric acid the marl in which nodules of this substance are found at Tajowa, Hungary. Under the microscope the little crystals appear with the orthorhombic symmetry. oP is the plane of their optical axes. Their axial angle for sodium light is 70° 24′ in air.

The same mineralogist[20] has repeated Gmelius' analysis of *helvite* from Schwarzenberg, and has obtained this result:

SiO_2	FeO	MnO	BeO	Al_2O_3	CoO	S	Total
31.85	4.26	42.47	14.25	.74	3.16	4.81	= 101.54

Dumortierite is recorded by Gonnard[21] as occurring in the feldspar of a granite vein cutting the gneiss in a quarry at Ternières, Francheville, Dept. of the Rhone, France.

The same writer[22] figures a few new types of *natrolite* crystals from the Puy-de-Dôm, and describes[23] the occurrence of crystals of *analcite* in the fissures of the porphyry at Agay, Canton Hyères, France.

Brazilite, analyzed by Blomstrand,[24] has the following composition:

ZrO_2	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	Alk	Loss	Total
96.52	.70	.43	.41	.55	.10	.42	.39	= 99.52

Experiments in Crystallization.—Hundt[25] has repeated Vogel-

[17] Bull. d. l. Soc. Franc. d. Min., xv, p. 127.

[18] AMERICAN NATURALIST, Oct., 1892, p. 849. Ib., Apr., 1893, p. 385.

[19] Miner. Magazine, x, p. 24.

[20] Ib., x, p. 10.

[21] Bull. Soc. Franc. d. Min., xv, p. 230.

[22] Ib., p. 221.

[23] Ib., p. 231.

[24] Neues Jahrb. f. Min., etc., 1893, I, p. 89.

sang's experiments on the crystallization of sulphur from its solution in carbon bisulphide thickened with balsam, and has discovered thereby some new facts regarding the phenomena connected with the formation of crystals. He finds the globulites aggregating into *liquid* spherules of sulphur that may remain liquid for several days. Grains of sulphur that are melted on a glass plate may also remain in a liquid condition for a long time—in some instances, three months—before they solidify. Upon agitation with the point of a needle they immediately become solid. The author declares that there is no tendency among the globulites to arrange themselves into definite groups, as Vogelsang reported to be the case. In the largest drops, however, they may take definite positions, whereupon the entire drop may be made to crystallize by shaking or agitating with a needle point. The formation of crystallites is contemporaneous with that of the globulites, the latter giving rise to the large drops, which, upon soldifying, become spherulites, and the former growing into microlites by the accretion of *invisible* particles. The crystallites do not grow by the addition of globulites. These bodies add themselves to the large drops, and never to the small, solid embryo crystals.

Miscellaneous.—A couple of *slags* from the lead ovens of Raibl, Austria, have been examined chemically by Heberdey.[26] The composition of different portions of the various specimens were carefully worked out. In one specimen crystals of a lead-zinc *olivine* were found, the analysis of which yielded:

SiO_2	PbO	ZnO	MgO	FeO	CaO	Total
16.62	61.50	18.16	1.99	1.69	tr =	99.96

Their density is 5.214 and axial ratio $a : b = .8592 : 1$. In an appendix to his main article the author gives the results of analyses of the limestone in which the galena smelted in the furnace occurs. One of these analysis yielded: $CaCO_3 = 53.50$; $MgCO_3 = 46.51$; Fe, Tl, Li = traces.

Dunnington and Whitlock[27] communicated the results of an analysis of a *black soil* from a point in the valley of the Red River of the North, about fifteen miles south of Winnipeg, Manitoba, and Corse and Baskerville[28] the results of analyses of *glauconite* sand from near Han-

[25] Mitth. d. miner. Inst. d. Univ. Kiel. B 1. H. 4., p. 310.

[26] Zeits. f. Kryst., xxi, 1892, p. 56.

[27] American Chem. Journal, 14, 1892, p. 621.

[28] Ib., p. 627.

over Court House, Virginia. Analyses follow (I, black soil; II, glauconite):

	Sand	SiO_2	TiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	SO_3	CO_2	P_2O_5	K_2O	Org.	H_2O
I	59.82	5.45	.64	7.14	4.00	.61	.61	.03	.37	.13	1.91	12.49	6.86

	Quartz	SiO_2	Al_2O_3	Fe_2O_3	FeO	CaO	MgO	K_2O	Na_2O	H_2O		Total
II	2.76	47.45	7.33	12.03	9.43	.57	2.90	5.75	.42	9.85	=	98.49
	8.22	43.34	6.62	15.16	8.33	.62	.95	4.15	1.84	10.32	=	99.55

Schwartz has treated in a comprehensive essay[29] the history of the observations on *reciprocal changes* produced in polymorphous bodies under different conditions of temperature, and has, in addition, given the results of some independent observations of his own. The substances that have been experimented upon are: AgI, KNO_3, NH_4, NO_3, $AgNO_3$, Rb (NO_3), boracite, perchlorethane, tetrabrommethane, and copper, nickel, zinc and cobalt, sodium-uranyl acetates.

Ch. Friedel[30] has examined carefully a specimen of the meteoric iron from Cañon Diablo, Arizona, and, as a result of his study, has concluded that particles of black diamond (carbonado) are disseminated through its mass. A combustion of the residue obtained upon treatment of the iron by acids leaves no doubt but that the material consists principally of carbon.

[29] Gekronte Preisschr. Univ. Goëtinger, 1892.

[30] Bull. Soc. Franc. d. Min., xv, p. 258.